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(54) **SEALING STRUCTURE OF AIR-POCKET FILM MACHINE**

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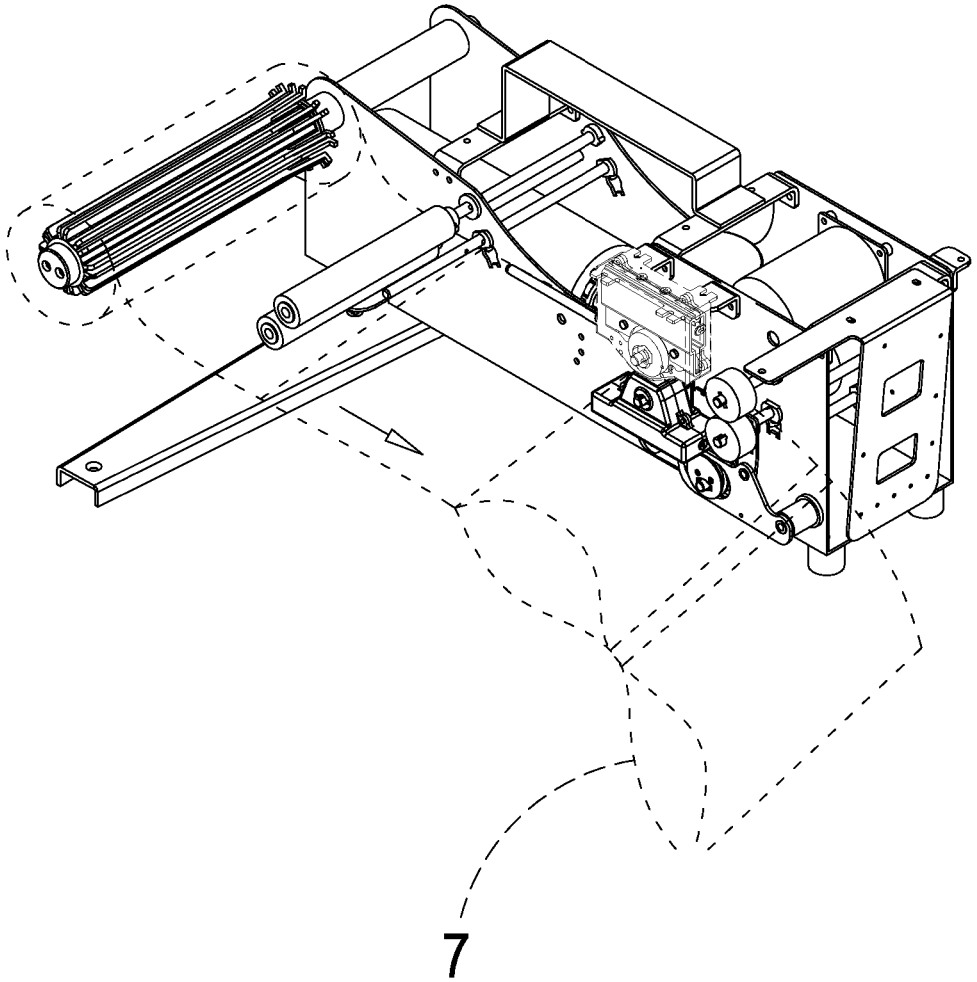
(57) **ABSTRACT**

A sealing structure of an air-pocket bag machine includes at least one heating plate, a sealing roller that is rotatably mounted to and positioned against the heating plate for conducting a heating and pressing operation on and thus sealing at least one air-pocket bag through a heating operation of the heating plate, and at least one driving roller that is coaxially and rotatably coupled to the sealing roller for driving and advancing the air-pocket bag. With such an arrangement, when the air-pocket bag machine is activated, the air-pocket bag is driven by being in contact engagement with the driving roller and thus is moved to fast, stably, and continuously pass under the sealing roller. Due to the sealing roller and the driving roller being rotatably coupled in a coaxial manner, the advancing speed of the air-pocket bag is consistent with the rotational speed of the sealing roller.



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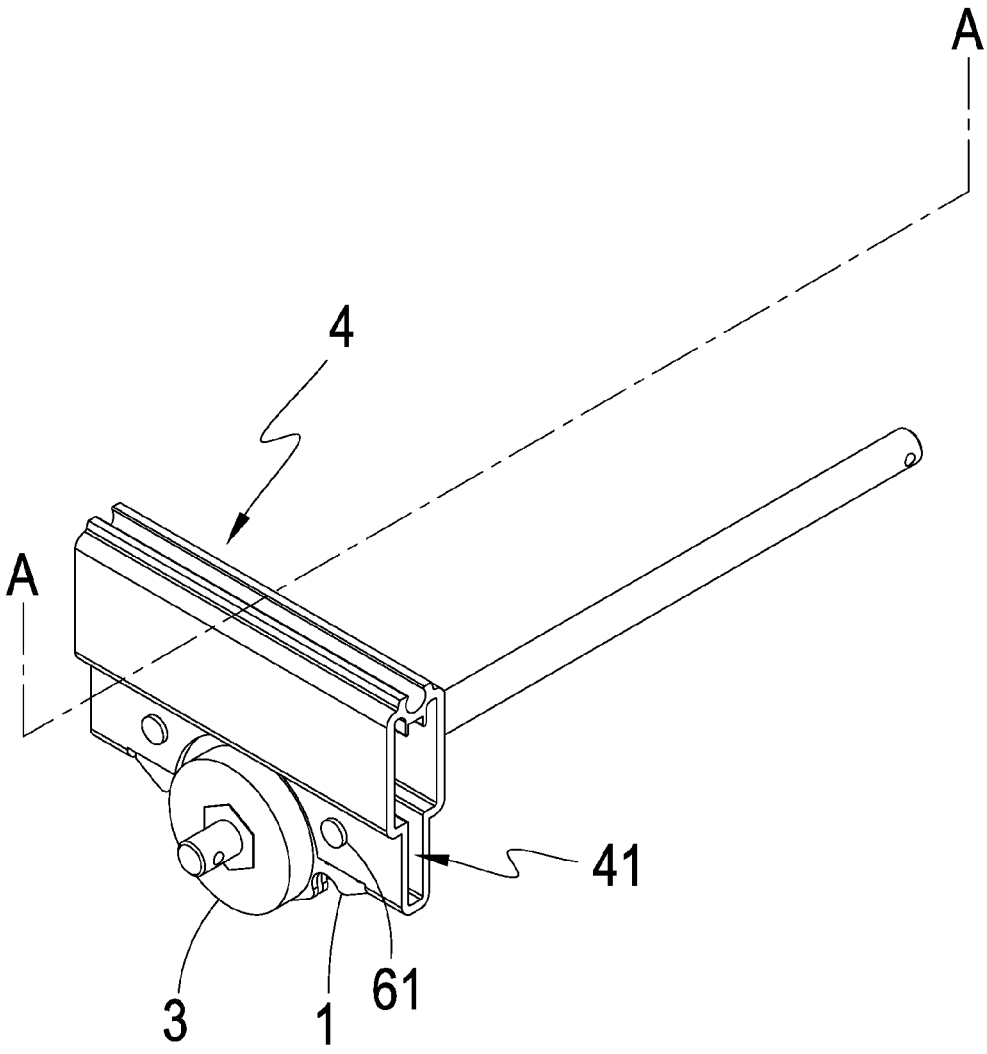

FIG. 1

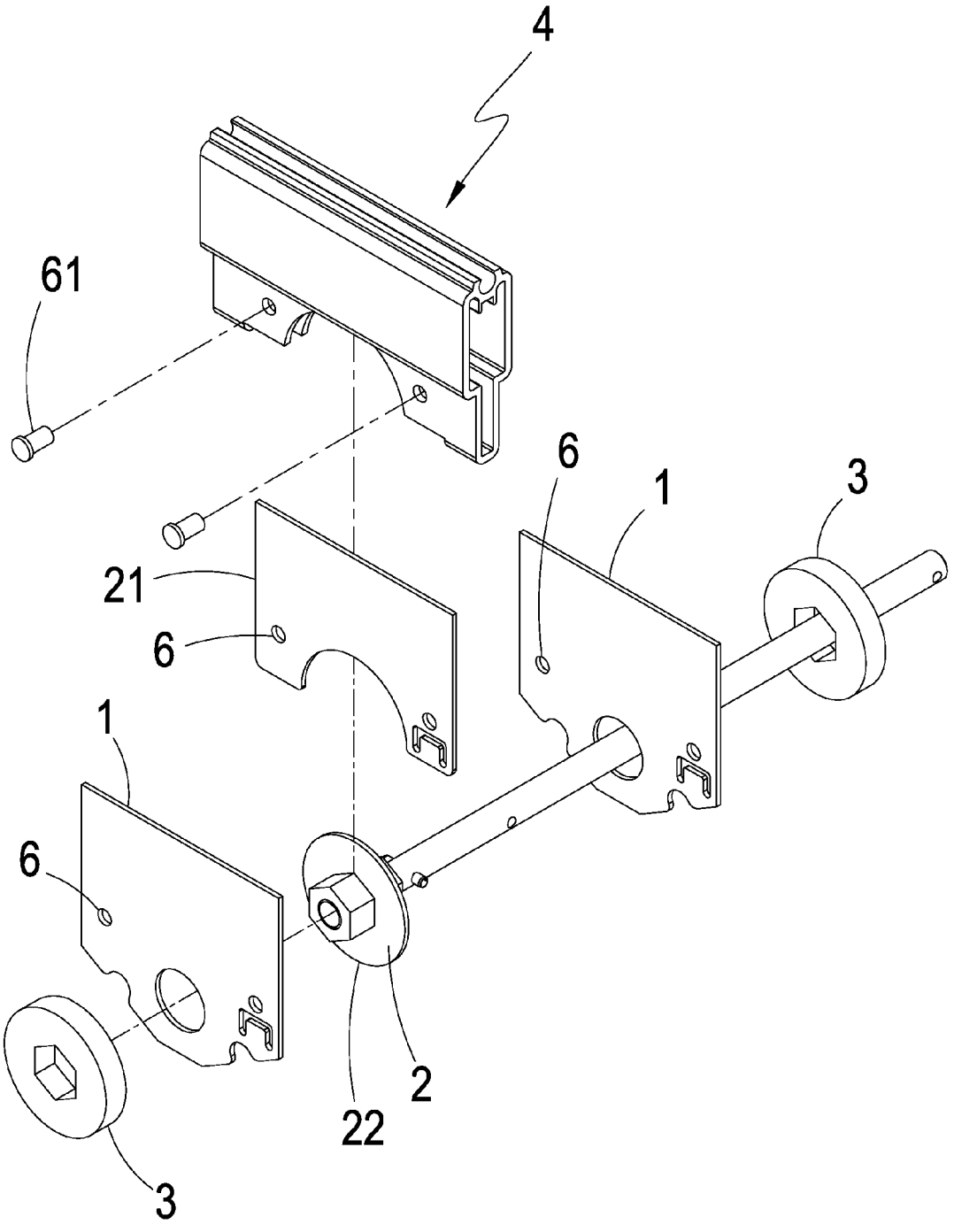

FIG. 2

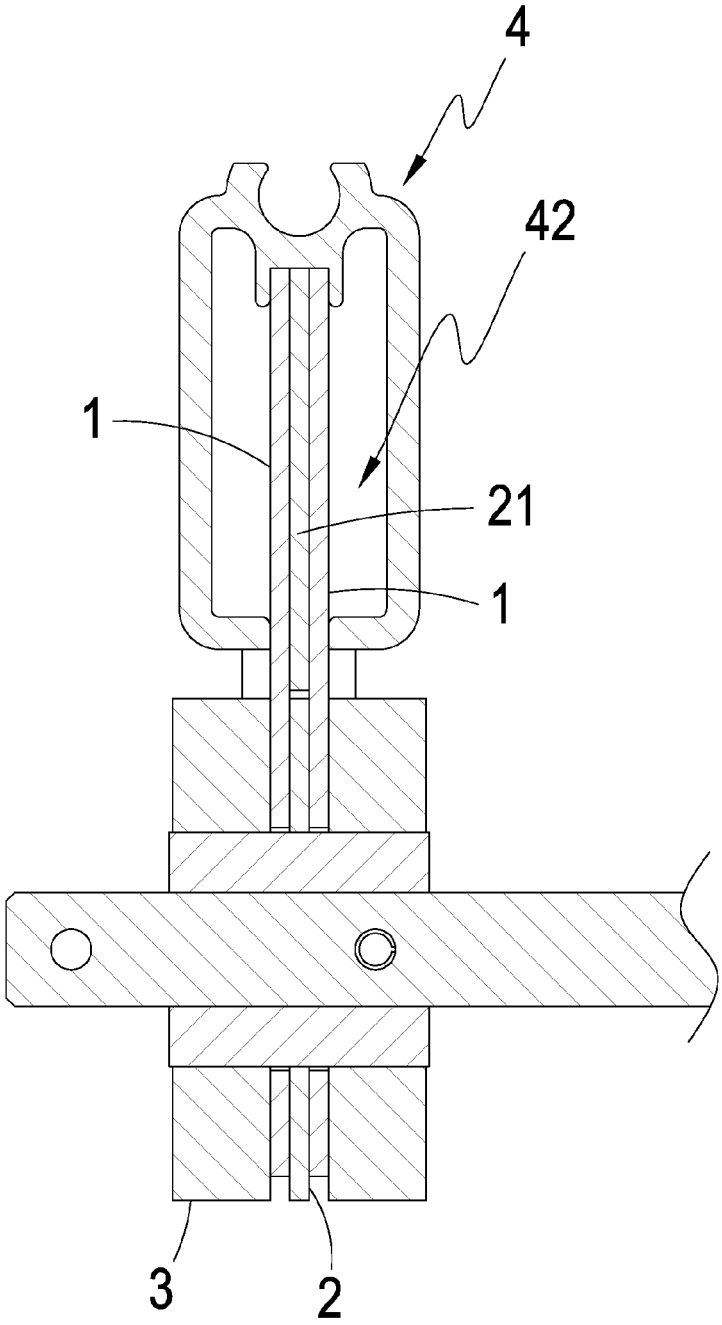

FIG. 3

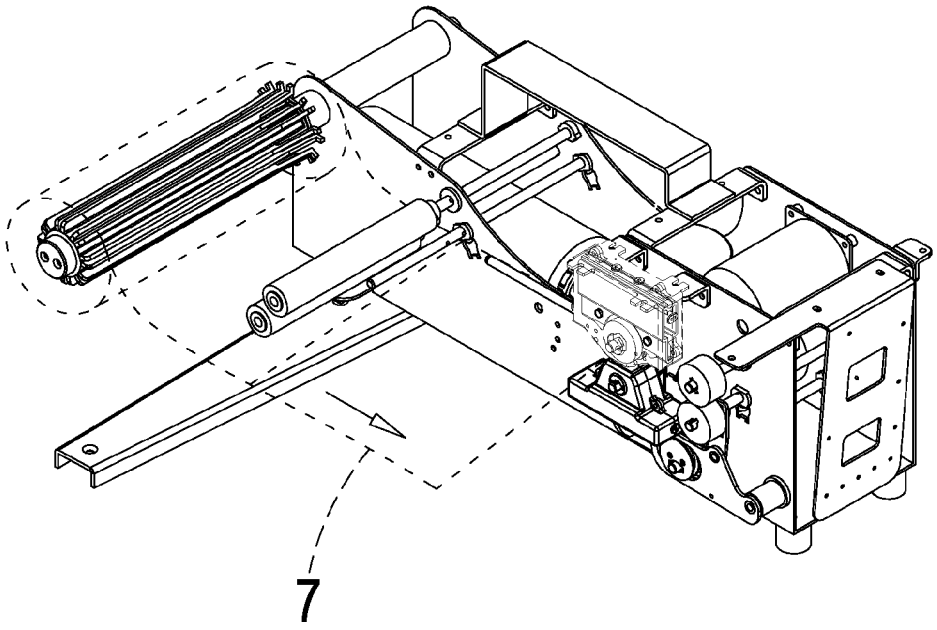

FIG. 4

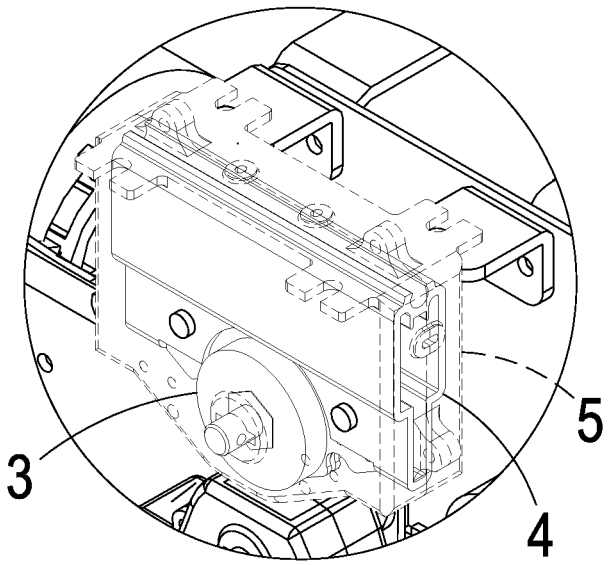

FIG. 4A

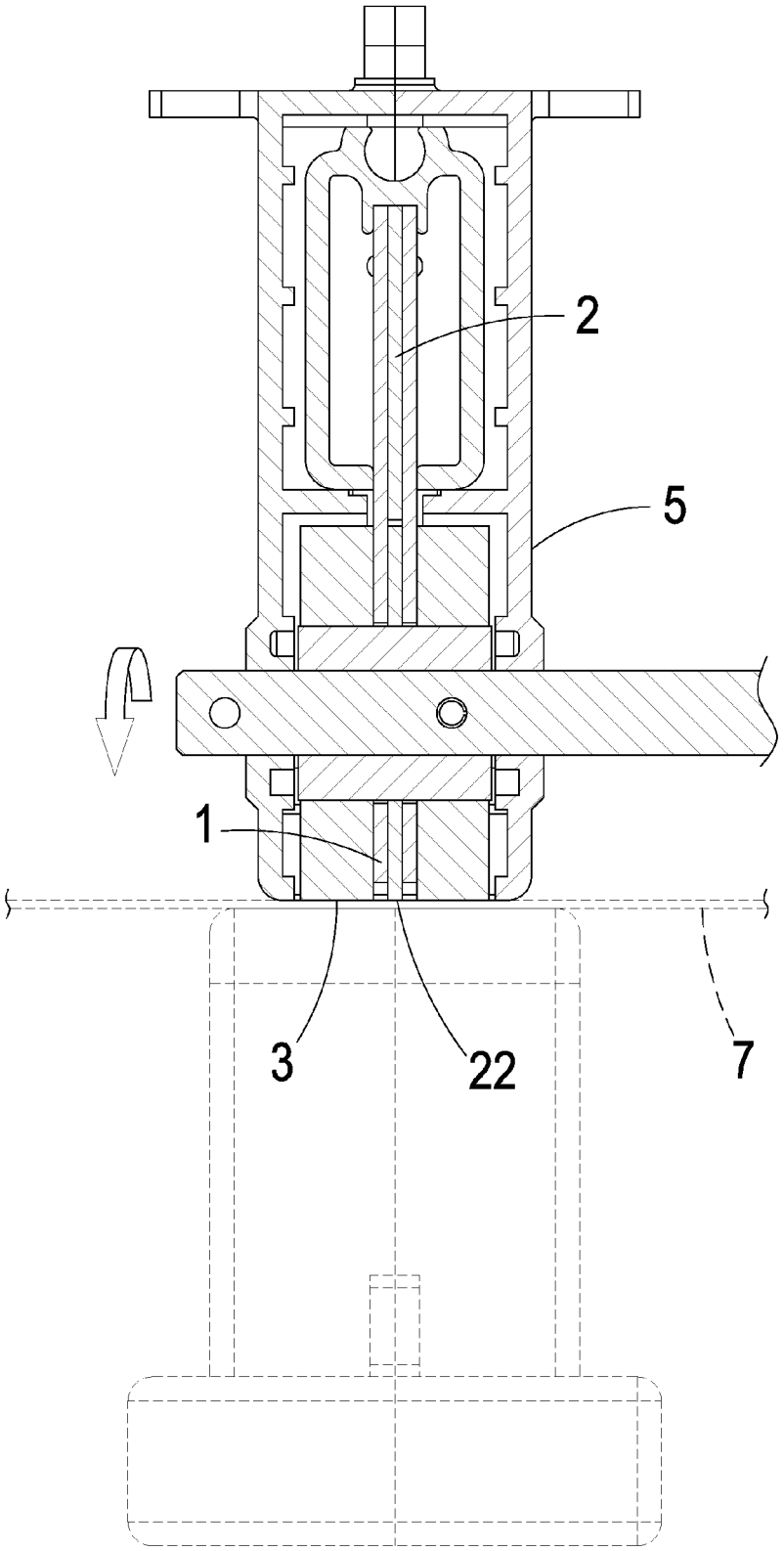

FIG. 5

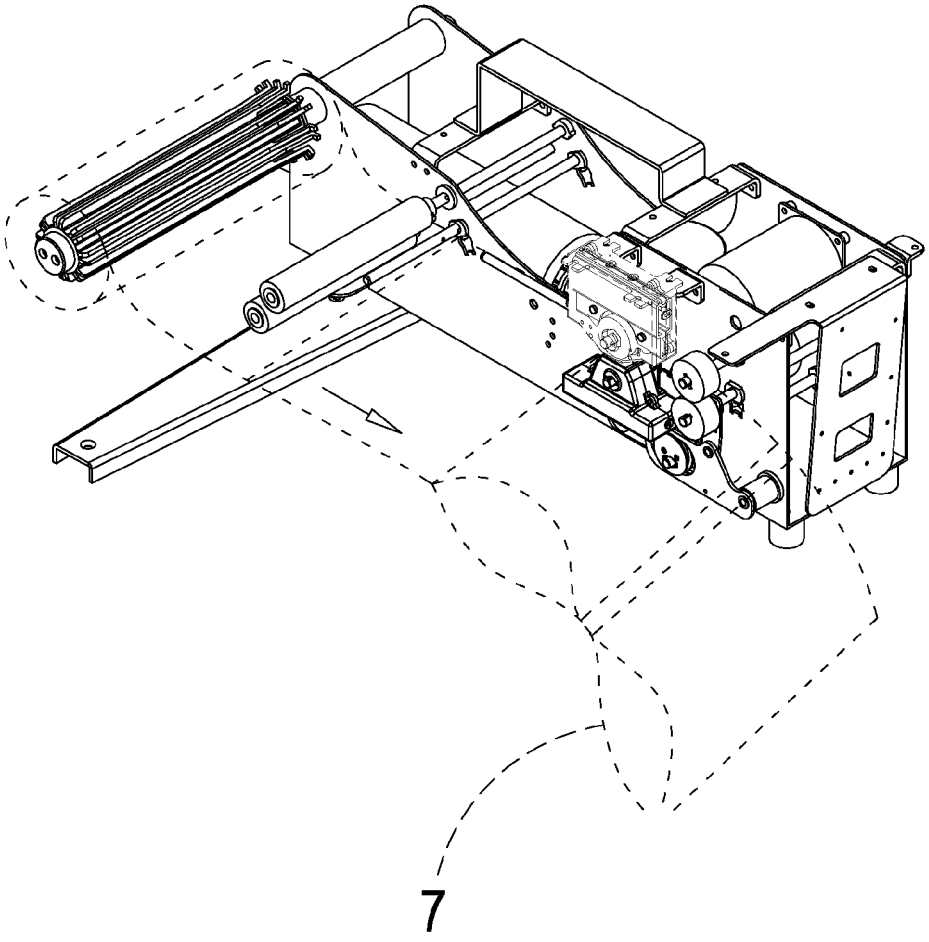

FIG. 6

SEALING STRUCTURE OF AIR-POCKET FILM MACHINE

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates generally to an improved sealing structure of an air-pocket bag machine, and more particularly to an improved sealing structure of an air-pocket bag machine that provides a uniform heating effect and allows a sealing operation to be performed at an increased speed.

DESCRIPTION OF THE PRIOR ART

[0002] An article, after being packaged with a package bag, shows advantages of being neat and clean and free of contamination and has a good outside appearance for sale and thus, the sale price can be increased. Further, to protect articles from damages caused by compression and impact, the articles are often packed with air-bubble wraps, or cushioning materials, such as air-bubble sheets, Styrofoam, slit pieces of paper, and balls of used paper, are stuffed between the articles and a package box. Among these materials, an air-pocket bag is structured by filling air into a package bag before an opening is sealed; and then, the opening of the package bag is sealed to form an air-pocket bag. The air-pocket bag can be stuffed between a package box and articles to provide a pneumatic cushion so as to reduce impact forces acting on the articles and to minimize damage and impact.

[0003] A conventional air-pocket bag machine that manufactures air-pocket bags comprises a sealing device, which generally comprises a heating element, such as a heating pressing bar or a heating plate. When an air-pocket bag is conveyed by guide rollers to pass under the sealing device, the heating element that is arranged at one side of a conveyance path of the air-pocket bag must be set in engagement with and apply a force to the air-pocket bag by traveling from one side of the air-pocket bag all the way to the opposite side of the bag to complete the sealing operation. Due to the heating operation being performed long and continuously, heat is greatly lost from the contact area of the heating element with the air-pocket bag, leading to a consequence of irregular heating, or the bag opening may get broken due to excessively high temperatures.

[0004] The above-described air-pocket bag sealing device suffers the following drawbacks, which require further improvements:

[0005] (1) The heating operation is fixed-point heating and irregular heating may result from continuous heating.

[0006] (2) When packaging speed is increased, the contact area between the air-pocket bag and the heating element is often shifted undesirably and incomplete sealing of the bag opening may result.

[0007] Thus, it is a challenge of the present inventor and those involved in this business to provide a solution to overcome such problems.

SUMMARY OF THE INVENTION

[0008] In view of the above problems, the present invention aims to provide an improved sealing structure of an air-pocket bag machine that provides an effect of stably heating and sealing an opening in a high-speed packaging operation.

[0009] An object of the present invention is to have a driving roller and a heated sealing roller rotatably mounted in a coaxial manner in order to improve an overall heating result and thus indirectly increasing the sealing speed of an air-pocket bag machine.

[0010] To achieve the above object, the present invention provides a structure that comprises: at least one heating plate, a sealing roller rotatably mounted to and positioned against the heating plate, the sealing roller conducting a heating and pressing operation on and thus sealing at least one air-pocket bag by means of a heating operation of the heating plate, at least one driving roller that is rotatably mounted to be coaxial with the sealing roller for driving and advancing the air-pocket bag. When the present invention is embodied in an air-pocket bag machine, a heating and sealing operation is achieved with the following three synchronously performed operations. The first one is that the heating plate is kept in contact engagement with the sealing roller so as to have the sealing roller reach a high temperature in a fast and uniform manner. The second one that the driving roller drives and advances the air-pocket bag by means of a frictional force so as to have the advancing speed of the air-pocket bag consistent with the rotational speed of the driving roller. And, the third one is that the coaxial and rotatable arrangement of the driving roller and the sealing roller coupled to each other helps stabilize the result of heating, pressing, and sealing by the sealing roller. As such, an excellent sealing effect can be achieved even through a high speed sealing operation is conducted with the air-pocket bag machine.

[0011] With such an arrangement, the problems of the prior art sealing device of an air-pocket bag that heating is not uniform, positional shift between an air-pocket bag and a contact surface of a heating element may readily occur, and sealing of an opening may not be done in a complete manner can be overcome.

[0012] The foregoing objectives and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

[0013] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** is a perspective view showing a preferred embodiment of the present invention.

[0015] FIG. **2** is an exploded view showing the preferred embodiment of the present invention.

[0016] FIG. **3** is a cross-sectional view of the preferred embodiment of the present invention taken along line A-A of FIG. **1**.

[0017] FIG. **4** is a schematic view illustrating an operation of the preferred embodiment of the present invention.

[0018] FIG. **4**A is an enlarged view of a circled portion of FIG. **4**.

[0019] FIG. **5** is another schematic view illustrating an operation of the preferred embodiment of the present invention.

[0020] FIG. **6** is a schematic view showing a use condition of the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] The following descriptions are exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0022] Referring to FIGS. **1**, **2**, and **3**, which are respectively a perspective view and an exploded view of a preferred embodiment of the present invention and a cross-sectional view taken along line A-A of FIG. **1**, these drawings clearly show that the present invention comprises:

[0023] at least one heating plate **1**;

[0024] a sealing roller **2** that is rotatably mounted to and positioned against the heating plate **1** to apply heating and pressing to and thus sealing at least one air-pocket bag through a heating operation conducted by the heating plate **1**, the sealing roller **2** having an outer circumference that defines a contact surface **22**, the sealing roller **2** comprising a heat conduction board **21** in contact engagement with the heating plate **1**;

[0025] a base **4** that houses the heating plate **1** and the heat conduction board **21** therein, the base **4** comprising a receiving space **41** for receiving the heating plate **1** and the heat conduction board **21** and at least one isolation space **42** at one side of the receiving space **41**;

[0026] at least one driving roller **3** that is coaxially and rotatably mounted with the sealing roller **2** for driving the air-pocket bag, the driving roller **3** being made of a rubber material; and

[0027] the heating plate **1**, the heat conduction board **21**, and the base **4** being each provided with at least one positioning hole **6**, so as to have a fastener **61** received in and extending through the positioning hole **6**.

[0028] The structure of the present invention has been illustrated with the above description. Such a structure provides advantages of allowing for a sealing operation to be performed at an increased speed, achieving uniform heating result, and stable sealing effect. Details will be further provided in the following.

[0029] Referring to FIGS. **1-6**, which are respectively a perspective view and an exploded view of a preferred embodiment of the present invention, a cross-sectional view taken along line A-A of FIG. **1**, a schematic view illustrating an operation of the preferred embodiment of the present invention, an enlarged view of a circled portion of FIG. **4**, another schematic view illustrating an operation of the preferred embodiment of the present invention, and a schematic view showing a use condition of the preferred embodiment of the present invention, these drawings clearly show that the sealing structure provided in the present invention is of a thinned configuration, wherein the heating plate **1** and the heat conduction board **21** are received and housed, in a compact arrangement, in the receiving space **41** of the base **4** with the fastener **61** extending through the positioning holes **6** to maintain a stable overall structural relationship in a condition of a high speed rotation of the sealing roller **2**. Further, the heating plate **1** is completely housed in and concealed inside a housing **5** with only the driving roller **3** and the sealing roller **2** partly exposed. Taking the instant embodiment as an example, opposite sides of the sealing roller **2** are respectively provided with a heating plate **1** and a driving roller **3**, of which details of operation will be illustrated in the following:

[0030] After activation of the air-pocket bag machine, the heating plate **1** immediately emits heat. The heat conduction board **21** of the sealing roller **2** is set in direct contact engagement, at a large area, with the heating plate **1** and an isolation space **42** is formed at the side of the heating plate **1** that is distant from the heat conduction board **21**, so that the heat emitting from the heating plate **1** is fast and directly conducted to the heat conduction board **21** to be further transmitted through the heat conduction board **21** to the sealing roller **2**. An air-pocket bag **7** that has been filled with air by the air-pocket bag machine is conveyed through the present invention by frictional engagement thereof with the driving roller **3** so as to have the air-pocket bag **7** advanced forward in such a way that the advancing or conveyance speed of the air-pocket bag **7** is consistent with a tangential speed of the driving roller **3**. Further, since the driving roller **3** and the sealing roller **2** are coaxially and rotatably coupled, when the sealing roller **2** is put into rotation, the contact surface **22** of the outer circumference of the sealing roller **2** applies pressing and heating to the air-pocket bag **7** in a uniform manner, wherein the heating and pressing operation of different sections is performed with different sections of the contact surface **22**. When the contact surface **22** of one portion of the sealing roller **2** is in contact engagement with the air-pocket bag **7** and thus loses heat, the contact surface **22** of an opposite portion is restored back to a preset temperature by contacting the heat conduction board **21**. As such, the sealing effect of the sealing roller **2** can be maintained uniform and thus, the quality of the air-pocket bag **7** can be maintained even through the sealing operation is performed at an increased speed in the air-pocket bag machine.

[0031] It will be understood that each of the elements described above, or two or more together may also find a useful application in other types of methods differing from the type described above.

[0032] While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions, modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the claims of the present invention.

I claim:

1. A sealing structure of an air-pocket bag machine, comprising:

at least one heating plate;

a sealing roller that is rotatably mounted to and positioned against the heating plate for conducting a heating and pressing operation on and thus sealing at least one air-pocket bag through a heating operation of the heating plate; and

at least one driving roller that is coaxially and rotatably coupled to the sealing roller for driving and advancing the air-pocket bag.

2. The sealing structure of the air-pocket bag machine according to claim **1**, wherein the sealing roller comprises a heat conduction board in contact engagement with the heating plate.

3. The sealing structure of the air-pocket bag machine according to claim **2** further comprising a base that houses the heating plate and the heat conduction board therein.

4. The sealing structure of the air-pocket bag machine according to claim **3**, wherein the base comprises, formed therein, a receiving space for receiving the heating plate and the heat conduction board and at least one isolation space at one side of the receiving space.

5. The sealing structure of the air-pocket bag machine according to claim **3**, wherein the heating plate, the heat conduction board, and the base each comprise at least one positioning hole formed therein.

6. The sealing structure of the air-pocket bag machine according to claim **5**, wherein the positioning hole receives a fastener to extend therethrough.

7. The sealing structure of the air-pocket bag machine according to claim **1**, wherein the sealing roller has an outer circumference forming a contact surface.

8. The sealing structure of the air-pocket bag machine according to claim **1**, wherein the driving roller is made of a rubber material.

9. The sealing structure of the air-pocket bag machine according to claim **1**, wherein the heating plate and the sealing roller are made of metallic materials.

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